LMS8000 / LMS4000
Feature Support Matrix

End User Modem Feature Support

Features not listed in the following table are similar in all models of End User Modem.

Feature	EUM 3000	EUM 3003	EUM 3004	EUM 3005	EUM 3006	EUM 8000
Adaptive Modulation[1]						X
Autoconfiguration via RADIUS[2]				X	X	X
Automatic Frequency Discovery[3]				X	X	X
CCU8000 Compatibility[4]				X	X	X
DHCP Client[5]				X	X	X
EUM Antenna Alignment Utility[6]	X	X	X	X	X	X
EUM Configuration Utility[7]	X	X	X			
Executable Image[8]: "app" series Executable Filename: "sa1110.exe"	X	X	X			
Executable Image[8]: "eum v1x.y" series Executable Filename: "eum.exe"				X	X	
Executable Image[8]: "eum v3x.y series Executable Filename: "eum.exe"						X
External Antenna Connector[9]	X	X	X	X		
Indoor Switched Beam Diversity Antenna Support[10]	X	X	X	X		
Integrated High-gain, Active Polarization Diversity Antenna[11]					X	X

Feature	EUM 3000	EUM 3003	EUM 3004	EUM 3005	EUM 3006	EUM 8000
Local Link Address Support[12]	X	X	X	X	X	X
MDB1000 Installation Tool Support[13]					X	X
OFDM: Multiple Modulation Schemes from 1.5 to 13.5 Mbps raw rate[14]						X
Outdoor Enclosure[15]					X	X
Power over Ethernet[16]					X	X
Radio Link Antenna Pointing Tool[17]				X	X	X
RSS (Received Signal Strength) LED[18]	X	X	X	X		
Secure Authentication[19]				X	X	
Serial Port[20]	X					
Setup Menu[21]				X	X	X
Simultaneous voice calls - two[22]	X	X	X	X	X	X
Simultaneous voice calls - more than two[22]	X			X	X	X
Temperature Rating (Operational) [C]	10 to 40	0 to 40	0 to 40	-10 to 50	-40 to 50[23]	-40 to 50[23]
TKIP Data Encryption[24]				X	X	

1. Adaptive Modulation selects the optimal transmit modulation scheme for the link to the CCU. Each EUM selects its own optimal scheme. See “Adaptive Modulation” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
2. Autoconfiguration allows the operator to configure EUM parameters remotely via RADIUS message attributes. CCU/NCL software version 6.0 or 20.0 or higher is required to support this. See “Configuring a RADIUS Server” in *LMS8000-LMS4000 Managing the Network* for details.
3. Automatic Frequency Discovery allows the EUM to determine which frequency and CCU to connect to based on the best available signal without operator intervention or configuration. CCU/NCL software version 5.0 or 20.0 or higher is required to support this. See “Automatic Frequency Discovery” in *LMS8000-LMS4000 Data Networking Concepts* for details.
4. These modems are compatible with the CCU8000. The EUM3005 and EUM3006 must have at least version 11.3 software to be compatible, otherwise no communication is possible. The CCU8000 will automatically use CCK modulation with the EUM3005 and EUM3006.
5. A DHCP client allows a unit to obtain its IP parameters from a central server, rather than having them statically configured by the operator. See “DHCP Client” in *LMS8000-LMS4000 Data Networking Concepts* and “Configuring a DHCP Server” in *LMS8000-LMS4000 Managing the Network* for details.
6. This Windows only graphical user interface utility can be used by an installer or an end user to optimally align the EUM antenna.
7. This Windows only graphical user interface utility can be used to configure EUM parameters. See *LMS8000-LMS4000 EUM Configuration Utility Guide* for details.

8. Different models support different software images with different names. For example, to upgrade the EUM3006 to version 11.3, the file eumv113b2.exe from the WaveRider web site is put to the EUM as eum.exe. See “Upgrading the Network” in *LMS8000-LMS4000 Managing the Network* for details.
9. See “Antenna Connector” in *LMS8000-LMS4000 Radio Networking Concepts* and the installation manual for the unit for details.
10. These models support the WaveRider Indoor Switched-beam Diversity Antenna, which provides robust indoor operation and can be installed simply by the end user. See the associated EUM installation guide for details.
11. These models include an Integrated High-gain, Active Polarization Diversity Antenna so that no external antenna is required. See the associated EUM installation guide for details.
12. These models always respond at the local link address 169.254.10.250 on the Ethernet port. See *LMS8000-LMS4000 Data Networking Concepts* for details. NOTE: CCU is different.
13. The MDB1000 is a handheld monitoring device that displays signal strength and quality information useful for optimally aligning an EUM antenna. See the associated EUM installation guide for details.
14. These models support OFDM modulations as well as CCK. Different schemes trade off data rate for robustness over distance and multipath, for raw data rates of 1.5 Mbps to 13.5 Mbps and user data rates up to 8 Mbps. See “OFDM Modulation Schemes” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
15. These models have a rugged, weather-resistant enclosure designed for outdoor, unsheltered installation. Compliant with ETSI-300-019-1-4 Class 4.1 with extended temperature range (similar to NEMA-4).
16. Standard 48V 802.3af mode B power supply eliminating the need for a separate power cable.
17. These models support a simplified bar graph display of signal strength and quality useful for an end user self installation for optimally aligning the EUM antenna. See the associated EUM installation guide for details.
18. These EUM models have a visible indicator of received signal strength for optimally aligning the antenna. See the associated EUM installation guide for details.
19. Secure Authentication uses a 256 bit secret authentication key and the 4-way handshake mechanism of Wireless Protectected Access 2 (WPA2) to provide mutual authentication of EUM to CCU and CCU to EUM. See “Security” in *LMS8000-LMS4000 Data Networking Concepts* for details.
20. These models support a serial port for access to the command line interface. See “Access Interface” in *LMS8000-LMS4000 Managing the Network* for details.
21. These models allow an end user to access a setup menu for installation, the antenna alignment tool and diagnostic information without requiring knowledge of the unit IP address or password or allowing the end user to change unit configuration. See the associated EUM installation manual for details.
22. All models can support at least two simultaneous VoIP calls on one EUM. Some models of EUM support multiple calls (up to 16 depending on codec). See “Voice over IP Capacity” in *LMS8000-LMS4000 Data Networking Concepts* for details.
23. Plus solar loading up to 1120 W/m^2
24. Industry standard IEEE802.11 TKIP Encryption is used to protect user data privacy and integrity. See “Security” in *LMS8000-LMS4000 Data Networking Concepts* for details.

The table above applies with version 7.0 software in the EUM3000, EUM3003 or EUM3004; version 11.3 software in the EUM3005 or EUM3006 and version 30.1 software in the EUM8000.

Base Station Modem Feature Support

Features not listed in the following table are similar in all models of Base Station Modem.

Table 1 Base Station Modem Feature Support

Feature	CCU 3000	CCU 3100	CCU 3110	CCU 8000	CCU 8010
Adaptive Modulation[1]				X	X
Antenna diversity control[2]		X	X	X	X
Executable Image[3]: “app” series Executable Filename: “sa1110.exe”	X				
Executable Image[3]: “ccu v2x.y” series Executable Filename: “ccu.exe”		X	X		
Executable Image[3]: “ccu v4x.y series Executable Filename: “ccu.exe”				X	X
Extended SNMP MIB Support[4]		X	X	X	X
External Antenna Connector[5]	X	X		X	
Grade of Service File Creation Utility[6]	X				
Integrated High-gain, Active Polarization Diversity Antenna[7]			X		
Integrated High-gain, Manual Polarization Diversity Antenna[8]					X
Local Link Address Support[9]		X	X	X	X
Maximum EUMs Supported[10]	300	300	300	300	300
MDB1000 Installation Tool Support[11]			X	X	X
OFDM: Multiple Modulation Schemes from 1.5 to 13.5 Mbps raw rate[12]				X	X
Outdoor Enclosure		X[14]	X[13]	X[14]	X[13]
Power over Ethernet[15]		X	X	X	X
Radio LED[16]	X	X		X	
Secure Authentication[17]	X	X	X		
Serial Port[18]	X				
Temperature Rating (Operational) [C]	0 to 50	-40 to 55	-40 to 50[19]	-40 to 55	-40 to 50[19]
TKIP Data Encryption[20]	X	X	X		

1. Adaptive Modulation selects the optimal transmit modulation scheme for each link to an EUM. The CCU selects the optimal scheme for each EUM individually, so that EUMs nearby can use high rates and EUMs far away can use low rates simultaneously. See “Adaptive Modulation” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
2. The diversity mode used for antenna selection can be set in these models. See “Antenna Diversity Mode” in *LMS8000-LMS4000 Managing the Network* for details
3. Different models support different software images with different names. For example, to upgrade the CCU3000 to version 7.0, the file appv707.z from the WaveRider web site is put to the CCU as sa1110.exe. See “Upgrading the Network” in *LMS8000-LMS4000 Managing the Network* for details.
4. These models support extended enterprise MIBs. See *LMS8000-LMS4000 SNMP Reference Manual* for details.
5. See “Antenna Connector” in *LMS8000-LMS4000 Radio Networking Concepts* and the installation manual for the unit for details.
6. This Windows only graphical user interface can be used by the operator to create custom grades of service. A library of specialized grades of service for different models is available at support.waverider.com. See *LMS8000-LMS4000 GOS File Creation Utility User Guide* for details.
7. These models include an Integrated High-gain, Active Polarization Diversity Antenna so that no external antenna is required. See the associated installation guide for details.
8. These models include an Integrated High-gain, Manual Polarization Diversity Antenna so that no external antenna is required. See the associated installation guide for details.
9. These models always respond at the local link address 169.254.10.249 on the Ethernet port. See *LMS8000-LMS4000 Data Networking Concepts* for details. NOTE: EUM is different.
10. Total number of EUMs that can be registered at any one time. See “Basic Data Transmission” in *LMS8000-LMS4000 Data Networking Concepts* for details.
11. The MDB1000 is a handheld monitoring device that displays signal strength and quality information useful for optimally aligning an antenna. See the associated installation guide for details.
12. These models support OFDM modulations as well as CCK. Different schemes trade off data rate for robustness over distance and multipath, for raw data rates of 1.5 Mbps to 13.5 Mbps and user data rates up to 8 Mbps. See “OFDM Modulation Schemes” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
13. These models have a rugged, weather-resistant enclosure designed for outdoor, unsheltered installation. Compliant with ETSI-300-019-1-4 Class 4.1 with extended temperature range (similar to NEMA-4).
14. These models have a rugged, weather-resistant enclosure compliant with IP66 but require a sunshield if deployed outdoors. The cavity filter and surge arrestor require enclosure.
15. Standard 48V 802.3af mode B power supply eliminating the need for a separate power cable.
16. The radio LED indicates how many EUMs are currently associated. See the installation guide for details.
17. Secure Authentication uses a 256 bit secret authentication key and the 4-way handshake mechanism of Wireless Protectected Access 2 (WPA2) to provide mutual authentication of EUM to CCU and CCU to EUM. See “Security” in *LMS8000-LMS4000 Data Networking Concepts* for details.
18. These models support a serial port for access to the command line interface. See “Access Interface” in *LMS8000-LMS4000 Managing the Network* for details.
19. Plus solar loading up to 1120 W/m^2
20. Industry standard IEEE802.11 TKIP Encryption is used to protect user data privacy and integrity. See “Security” in *LMS8000-LMS4000 Data Networking Concepts* for details.

The table above applies with version 7.0 software in the CCU3000; version 20.4 software in the CCU3100 and CCU3110; and version 40.1 software in the CCU8000.

Point to Point Master Station Feature Support

Features not listed in the following table are similar in all models of Point to point master.

Table 2 Point to Point Master Station Feature Support

Feature	NCL 1900	SL-900	NCL 8000	NCL 8010
Adaptive Modulation[1]			X	X
Antenna diversity control[2]		X		X
Executable Image[3]: “app” series Executable Filename: “sa1110.exe”	X			
Executable Image[3]: “ccu v2x.y” series Executable Filename: “ccu.exe”		X		
Executable Image[3]: “ccu v4x.y series Executable Filename: “ccu.exe”			X	X
Extended SNMP MIB Support[4]		X	X	X
External Antenna Connector[5]	X		X	
Grade of Service File Creation Utility[6]	X			
Integrated High-gain, Active Polarization Diversity Antenna[7]		X		
Integrated High-gain, Manual Polarization Diversity Antenna[8]				X
Local Link Address Support[9]		X	X	X
Maximum EUMs Supported[10]	20	1	1	1
MDB1000 Installation Tool Support[11]		X	X	X
OFDM: Multiple Modulation Schemes from 1.5 to 13.5 Mbps raw rate[12]			X	X
Outdoor Enclosure		X[13]	X[14]	X[13]
Power over Ethernet[15]		X	X	X
Radio LED[16]	X		X	
Secure Authentication[17]	X	X		
Serial Port[18]	X			
Temperature Rating (Operational) [C]	0 to 50	-40 to 50[19]	-40 to 55	-40 to 50[19]
TKIP Data Encryption[20]	X	X		

1. Adaptive Modulation selects the optimal transmit modulation scheme for each link to an EUM. The CCU selects the optimal scheme for each EUM individually, so that EUMs nearby can use high rates and EUMs far away can use low rates simultaneously. See “Adaptive Modulation” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
2. The diversity mode used for antenna selection can be set in these models. See “Antenna Diversity Mode” in *LMS8000-LMS4000 Managing the Network* for details
3. Different models support different software images with different names. For example, to upgrade the CCU3000 to version 7.0, the file appv707.z from the WaveRider web site is put to the CCU as sa1110.exe. See “Upgrading the Network” in *LMS8000-LMS4000 Managing the Network* for details.
4. These models support extended enterprise MIBs. See *LMS8000-LMS4000 SNMP Reference Manual* for details.
5. See “Antenna Connector” in *LMS8000-LMS4000 Radio Networking Concepts* and the installation manual for the unit for details.
6. This Windows only graphical user interface can be used by the operator to create custom grades of service. A library of specialized grades of service for different models is available at support.waverider.com. See *LMS8000-LMS4000 GOS File Creation Utility User Guide* for details.
7. These models include an Integrated High-gain, Active Polarization Diversity Antenna so that no external antenna is required. See the associated installation guide for details.
8. These models include an Integrated High-gain, Manual Polarization Diversity Antenna so that no external antenna is required. See the associated installation guide for details.
9. These models always respond at the local link address 169.254.10.249 on the Ethernet port. See *LMS8000-LMS4000 Data Networking Concepts* for details. NOTE: EUM is different.
10. Total number of EUMs that can be registered at any one time. See “Basic Data Transmission” in *LMS8000-LMS4000 Data Networking Concepts* for details.
11. The MDB1000 is a handheld monitoring device that displays signal strength and quality information useful for optimally aligning an antenna. See the associated installation guide for details.
12. These models support OFDM modulations as well as CCK. Different schemes trade off data rate for robustness over distance and multipath, for raw data rates of 1.5 Mbps to 13.5 Mbps and user data rates up to 8 Mbps. See “OFDM Modulation Schemes” in *LMS8000-LMS4000 Radio Networking Concepts* for details.
13. These models have a rugged, weather-resistant enclosure designed for outdoor, unsheltered installation. Compliant with ETSI-300-019-1-4 Class 4.1 with extended temperature range (similar to NEMA-4).
14. These models have a rugged, weather-resistant enclosure compliant with IP66 but require a sunshield if deployed outdoors. The cavity filter and surge arrestor require enclosure.
15. Standard 48V 802.3af mode B power supply eliminating the need for a separate power cable.
16. The radio LED indicates how many EUMs are currently associated. See the installation guide for details.
17. Secure Authentication uses a 256 bit secret authentication key and the 4-way handshake mechanism of Wireless Protectected Access 2 (WPA2) to provide mutual authentication of EUM to CCU and CCU to EUM. See “Security” in *LMS8000-LMS4000 Data Networking Concepts* for details.

18. These models support a serial port for access to the command line interface. See "Access Interface" in *LMS8000-LMS4000 Managing the Network* for details.
19. Plus solar loading up to 1120 W/m^2
20. Industry standard IEEE802.11 TKIP Encryption is used to protect user data privacy and integrity. See "Security" in *LMS8000-LMS4000 Data Networking Concepts* for details.

The table above applies with version 7.0 software in the NCL1900; version 20.4 software in the SL-900; and version 40.1 software in the NCL8000 and NCL8010.

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